

Robonaut 2 Simulation Data for Public Release

M.A. Diftler
Robonaut Project Manager
NASA/JSC
myron.a.diftler@nasa.gov

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Robonaut 2 Simulation

- The following data is part of a medium fidelity kinematic/dynamic simulation of Robonaut 2.
 - CAD Models
 - Mass Data
 - Spring Rates
 - Kinematic Data
- No internal component data is included

CAD Models

- The following graphics are pictures of the CAD models being released.
 - No internal components are shown
 - Only surface features are present

Medium Fidelity Sim Model Torso, Arms, Head, Backpack

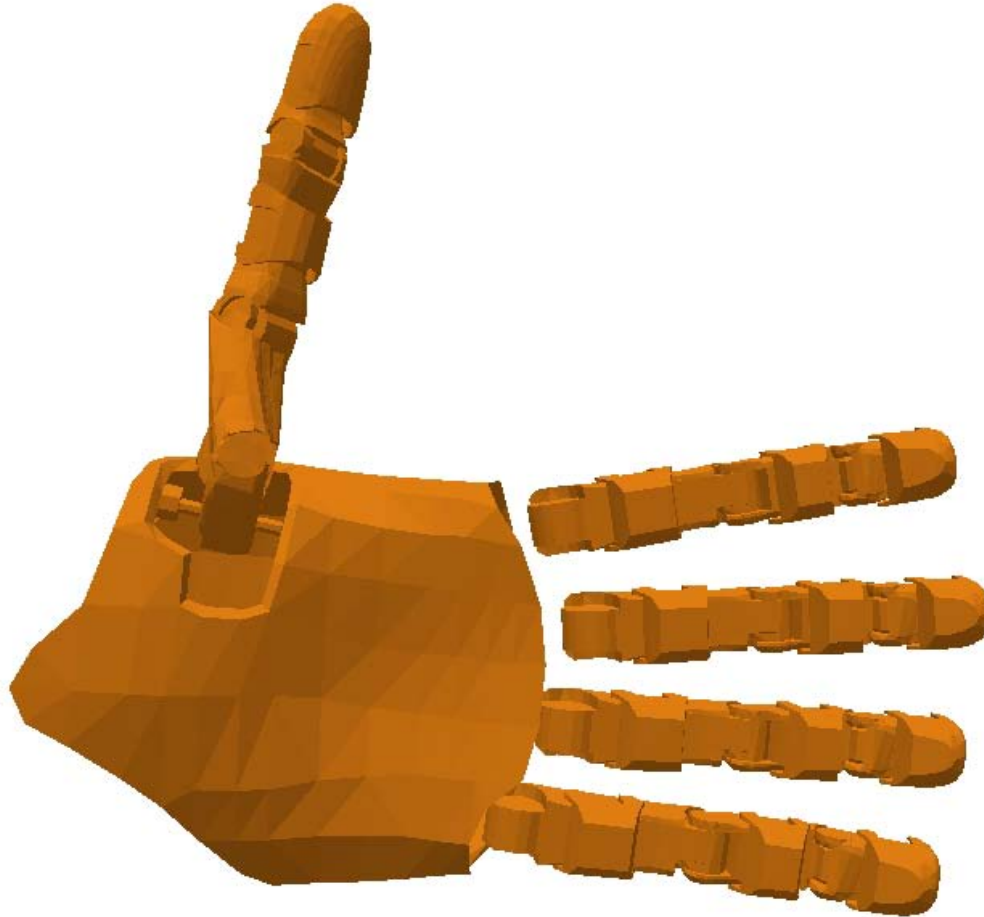


Simplified models as actually used in simulation

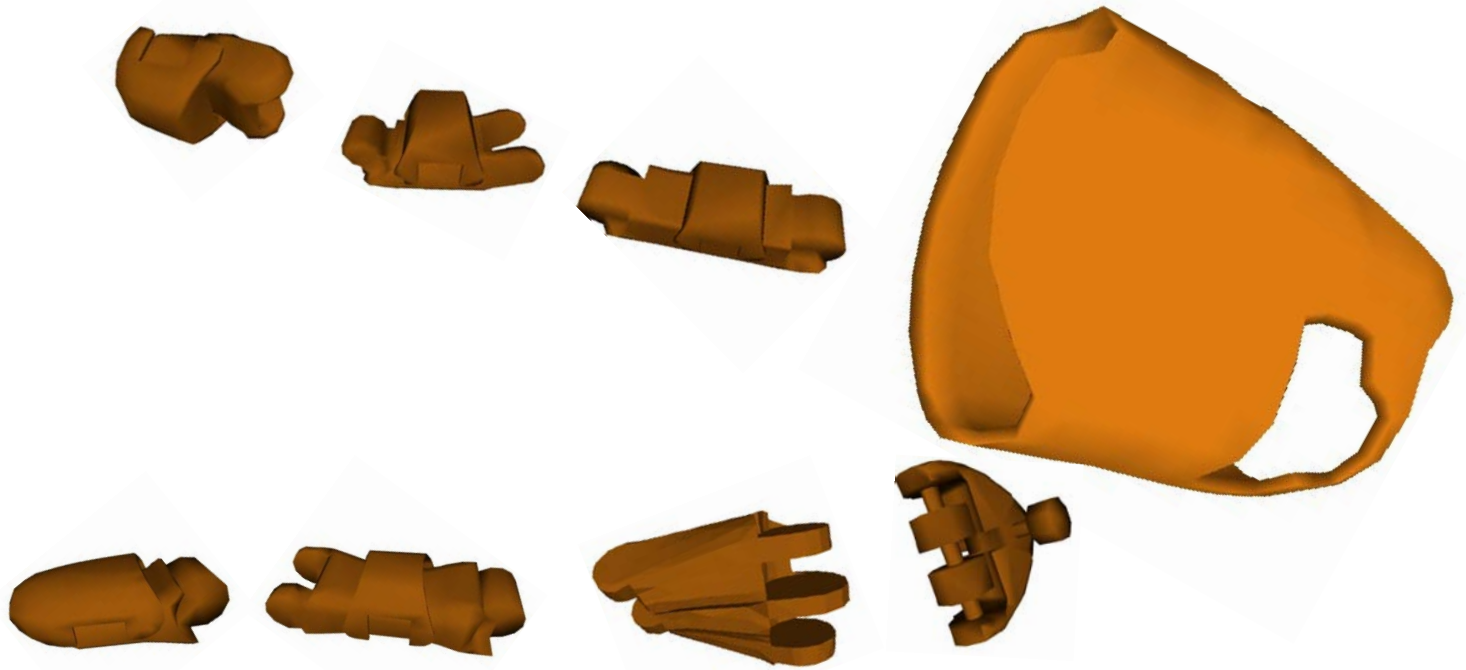


Medium Fidelity Sim Model

Palm and fingers

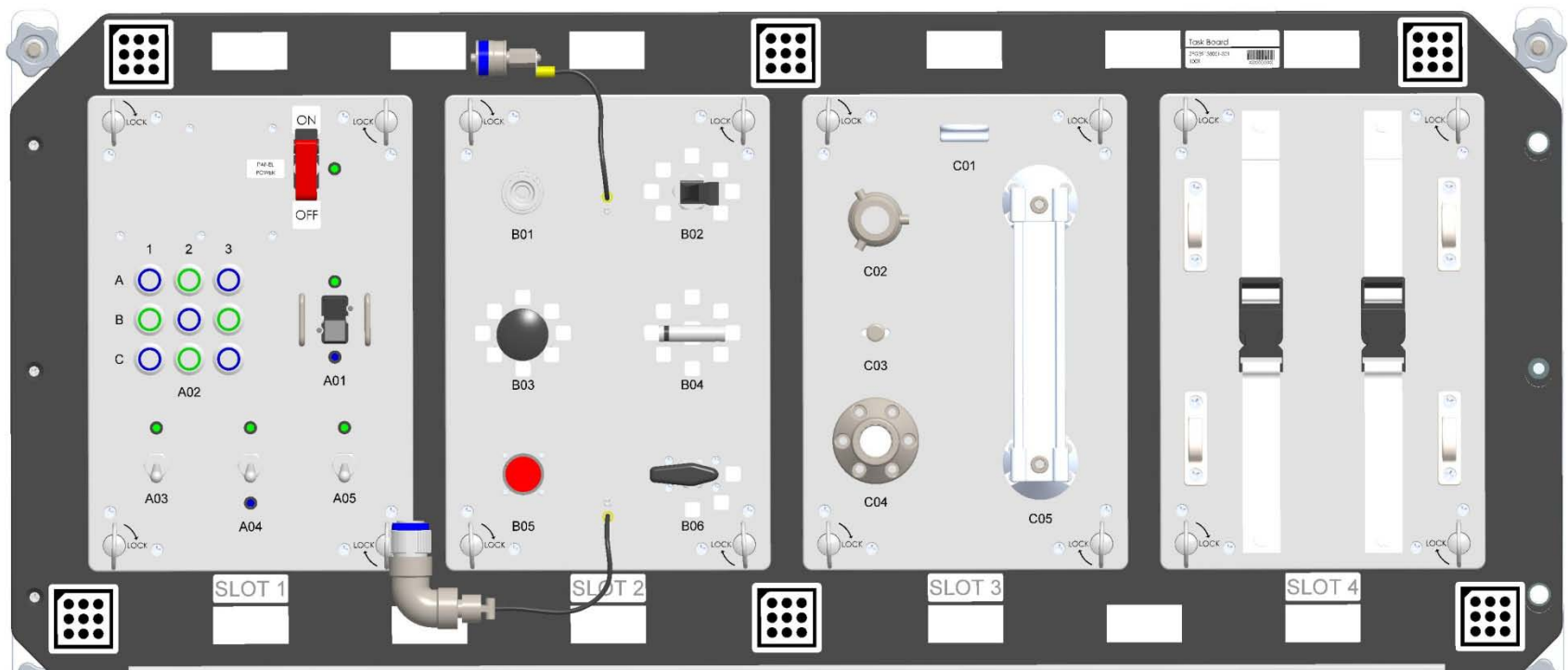


Simplified models as actually used in simulation



ISS Task Board model

Simulation will have this level of fidelity or less



Kinematic Data

- The following data is needed to link the joints together in the simulation allowing correct motion of the limbs when receiving commands from a user program
 - The data includes link dimensions and offsets
 - The data is in the embedded txt file below
(Double Click to open)

R2Kinematics_UB_1_11_12.txt

Mass Properties

- The following data is needed to run a low fidelity simulation of the robot's dynamics.
 - The data includes link masses, center of mass locations and inertias.

		Center of mass (relative to DH frame) (in.)			Inertia tensor (at center of mass) (lbs*in ²)					
Right arm link	Mass (lbs)	x	y	z	Ixx	Ixy	Ixz	Iyy	Iyz	Izz
1	1.36E+001	-5.18E-002	-4.05	3.54E-001	2.17E+002	1.35	-4.33E-001	6.79E+001	-2.06E+001	2.30E+002
2	9.76	-1.12E-002	3.07E-001	1.46	8.61E+001	-1.79E-001	7.42E-002	9.23E+001	5.17	3.89E+001
3	1.07E+001	-1.63	-4	2.92E-001	1.44E+002	-2.25E+001	-4.7	5.47E+001	-1.16E+001	1.58E+002
4	6.55	1.33	6.08E-001	1.03	3.60E+001	-4.06	1.08E+001	4.11E+001	5.61	3.02E+001
5	1.53E+001	-4.83E-002	-6.95	-1.40E-002	1.38E+002	-1.78	5.78E-001	4.28E+001	-8.36E-001	1.35E+002
6	2.57E-001	-1.60E-001	6.02E-006	-3.63E-002	1.97E-001	1.49E-007	6.01E-003	5.79E-002	1.86E-004	1.51E-001
7	2.62	2.66	9.99E-001	3.58E-002	6.81	-3.47E-001	-3.50E-001	1.03E+001	1.27	1.52E+001
		Center of mass (relative to DH frame) (in.)			Inertia tensor (at center of mass) (lbs*in ²)					
Left arm links	Mass (lbs)	x	y	z	Ixx	Ixy	Ixz	Iyy	Iyz	Izz
1	1.36E+001	-5.18E-002	4.05	-3.54E-001	2.17E+002	-1.35	4.33E-001	6.79E+001	-2.06E+001	2.30E+002
2	9.76	-1.12E-002	3.07E-001	1.46	8.61E+001	-1.79E-001	7.42E-002	9.23E+001	5.17	3.89E+001
3	1.07E+001	-1.63	4	-2.92E-001	1.44E+002	2.25E+001	4.7	5.47E+001	-1.16E+001	1.58E+002
4	6.55	1.33	6.08E-001	1.03	3.60E+001	-4.06	1.08E+001	4.11E+001	5.61	3.02E+001
5	1.53E+001	-4.83E-002	6.95	1.40E-002	1.38E+002	1.78	-5.78E-001	4.28E+001	-8.36E-001	1.35E+002
6	2.57E-001	-1.60E-001	6.02E-006	-3.63E-002	1.97E-001	1.49E-007	6.01E-003	5.79E-002	1.86E-004	1.51E-001
7	2.62	2.66	-9.99E-001	-3.58E-002	6.81	3.47E-001	3.50E-001	1.03E+001	1.27	1.52E+001

Spring Data

- R2 includes springs in the 5 largest arm joints and the waist. When this data is combined with the mass data, a low-medium fidelity approximation to the robots dynamics may be modeled.
 - Data for On-orbit Robonaut

Joint	Ft-lb/deg
1	120
2	120
3	34
4	34
5	17.5
Waist	210